

Remarks

Reconsideration of the application in view of the following remarks and allowance of all pending claims are respectfully requested. Claims 1-24 remain pending.

35 U.S.C. §112, Second Paragraph Rejection

In the Office Action dated May 8, 2006, claims 1, 9, and 17 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. With respect to the recitation of “said timer measuring ... and comprising one timer of a plurality of timers disposed in timer logic external to the central queue” in claims 1, 9, and 17, the Office Action alleges that it is not clear which limitation comprises one timer of a plurality of timers disposed in timer logic. On page 2, the Office Action states that these claims are read as if “‘said timer’ comprises one timer of a plurality of timers disposed in timer logic external to the central queue.” The Examiner’s stated reading of the recitation at issue is what was intended by the applicants. Moreover, the applicants’ specification (FIG. 2; FIG. 3; and paragraphs [0024] and [0025], for example) is consistent with this reading. Therefore, applicants respectfully submit that claims 1, 9, and 17 satisfy the definiteness requirement of 35 U.S.C. §112, second paragraph. For this reason, applicants respectfully request that the rejection of these claims under 35 U.S.C. §112, second paragraph be withdrawn.

35 U.S.C. §103(a) Rejection over Guttman et al. in view of Ross et al.

Claims 1, 9, and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 7,031,259 issued to Guttman et al. (hereinafter, “Guttman”) in view of U.S. Patent No. 5,247,517 issued to Ross et al. (hereinafter, “Ross”). Applicants respectfully traverse this rejection for the reasons below.

The present invention is directed to a method of and system for processing data packets for a node of a data transfer network. This method and system associate a separate timer with each data packet received and buffered in the node's central queue so that the length of time that a data packet has been buffered can be readily determined prior to the data packet being transmitted by the node. If a packet has been buffered too long, the queue discards the packet. Otherwise, the queue permits transmission of the packet. Advantageously, these packet timers are located external to the node's queue so that the processing load within the queue is decreased.

Another advantage of the present invention is that the packet timers approximately measure an interval of time directly. A packet timer that is associated with a received data packet is set to an initial state when the data packet is received in the central queue, and the timer's state is advanced periodically until the timer's state reaches a target state. The desired maximum packet buffering time is approximately measured by the timer's state transition sequence from the timer's initial state to the target state. Therefore, packet processing in the central queue is simplified because there is no need to compute the elapsed time between timestamps. Also, since the packet timer remains in the target state until it is reset by the central queue, the expiration of a packet timer may be determined simply by inspection of the timer's state. Examples of network nodes in which the present invention may be used include switches, routers, and network adapters.

In contrast to the present invention, Guttman is directed to providing a method and system for allocating bandwidth on a communication channel among a number packet streams from a number of sources, wherein the allocation is based on quality-of-service requirements for the packet streams (col. 4, lines 29-36). With respect to claim 1, applicants respectfully submit that Guttman does not teach or suggest a packet processing method for a node of a data transfer network, wherein the method comprises

associating a separate timer with each data packet received and stored by a central queue of the node, said timer measuring a length of time which said data packet is stored in said central queue and comprising one timer of a plurality of timers disposed in timer logic external to the central queue.

In the Office Action, the Examiner takes the position that a timer is implied by Guttman in col. 8, lines 7-12 because there Guttman discloses deleting a packet that has been stored in a scheduling table for a time that exceeds a time threshold. However, applicants respectfully submit that Guttman does not teach or suggest “associating a *separate timer with each data packet* received and stored by a central queue of the node” (emphasis added).

Instead, Guttman discloses associating packet characteristics with each packet or with the data stream to which a packet belongs (col. 5, lines 60-65). The packet characteristics associated with a packet or data stream are information about the packet or data stream, such as its priority, quality-of-service level, size, whether it is compressible, and timing information (col. 5, lines 60-65). Guttman gives a time stamp representing an upper time limit for transmitting the packet as an example of timing information (col. 5, line 66 to col. 6, line 3). Applicants respectfully submit that Guttman fails to teach or suggest “associating a separate timer with each data packet” because a time stamp is merely a particular state of a clock and because Guttman’s time stamp is information about a packet, not a timer for measuring a period of time. Moreover, contrary to claim 1, Guttman’s mention of a time stamp for indicating the time by which a packet must be transmitted at most may suggest a common clock for timing the storage period of all received packets wherein the clock is not associated with any packet. Such a system is very different from a system in which a separate timer is associated with each received data packet.

Additionally, applicants respectfully submit that Guttman does not teach or suggest the step of “providing said length of time [for which said data packet is stored in said central queue] to said central queue when said central queue is ready to transmit said data packet”. The Office Action alleges that control unit 76 of Figure 3 discloses this feature, but Applicants found no mention in Guttman, pertaining to Figure 3 or control unit 76, of a timer for determining the length of time a data packet has been stored in a central queue. Also, applicants found no mention of this length of time being provided to the central queue in Guttman. In contrast to the present invention, Guttman discloses that the control unit 76 utilizes the information in a scheduling table stored in scheduling table storage unit 78 to determine the next packet to transmit, and then control unit 76 sends a transmit control signal to the buffer in which this packet is stored (col. 10, lines 1-10). That is, Gutterman’s control unit 76 provides a transmit control signal to a buffer to command that a particular packet is to be transmitted. This is very

different from providing to a central queue the length of time a data packet has been stored therein when the central queue is ready to transmit the data packet.

Moreover, the Office Action admits on page 4 that Guttman fails to teach or suggest that the timer, which measures the length of time that a data packet is stored in the central queue, comprises “one timer of a plurality of timers disposed in timer logic external to the central queue.” Applicants respectfully submit that Ross fails to remedy this deficiency or the other deficiencies of Guttman enumerated hereinabove. For instance, timers 27 cited in the Office Action do not measure the length of time that data packets are stored in a queue. Instead, timers 27 of Ross pertain to analyzing and monitoring the performance of a token ring network (Abstract). Figure 3 of Ross illustrates four timers. None of them measure the length of time that a data packet is stored in the central queue of node of a data transfer network. Token timer 54 measures the time between detections of timing tokens on the token ring network (col. 7, lines 23-24). Abort timer 55 times the occurrence of abort events on the network (col. 7, lines 27-29). The carrier sense timer 56 measures the total time used for sending messages on the network (col. 7, lines 32-35). Clock timer 47 determines the sampling time interval over which network utilization is calculated (col. 7, lines 38-41 and lines 57-61).

Ross also does not teach or suggest the step of “associating a separate timer with each data packet received and stored by a central queue of the node,” wherein the timer measures the length of time for which the data packet is stored in the central queue of a node of a data transfer network for the reasons stated in the previous paragraph. In addition, Ross does not teach or suggest the step of providing the length of time, for which a data packet is stored in the central queue, to the central queue when the central queue is ready to transmit the data packet because Ross is directed to capturing data packets being transmitted in a token ring network for the purpose of analyzing the performance of the token ring network and not directed to transmitting data packets that are stored in a central queue of a node of a data transfer network.

Because the proposed combination of Guttman and Ross fails to teach or even suggest all elements of applicants’ claimed invention, as recited in claim 1, applicants respectfully submit that claim 1 is patentable over the proposed combination of Guttman and Ross. Applicants respectfully submit that independent claims 9 and 17 for a packet processing system and program

storage device embodying at least one program to perform a packet processing method, respectively, also recite subject matter that is patentable over the proposed combination of Guttman and Ross for the reasons stated above with respect to claim 1. Therefore, withdrawal of the rejection of claims 1, 9, and 17 under 35 U.S.C. §103(a) over Guttman in view of Ross is respectfully requested, and allowance of these claims is respectfully solicited.

35 U.S.C. §103(a) Rejection over Guttman et al. in view of Ross et al. and Fiacco et al.

Claims 2-8, 10-16, and 18-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 7,031,259 issued to Guttman et al. (hereinafter, "Guttman") in view of U.S. Patent No. 5,247,517 issued to Ross et al. (hereinafter, "Ross") and U.S. Patent No. 5,659,720 issued to Fiacco et al. (hereinafter, "Fiacco"). Applicants respectfully traverse this rejection for the reasons below.

Applicants respectfully point out to the Examiner that the remarks below refer to claim 1 because some features recited in claim 2, as originally filed, that were addressed on pages 5 and 6 of the Office Action had been added previously to claim 1 in a Preliminary Amendment filed on April 8, 2005. The proposed combination of Guttman and Ross fails to teach or even suggest all elements of applicants' claimed invention, as recited in claim 1, for the reasons stated above, and Fiacco fails to cure the deficiencies of the proposed combination of Guttman and Ross. For example, the proposed combination of Guttman and Ross fails to teach or suggest "associating a separate timer with each data packet received and stored by a central queue of the node" for the reasons stated above. Applicants respectfully disagree with the allegation in the Office Action that Fiacco teaches or suggests a packet processing method for a node of a data transfer network, wherein the method comprises "associating a separate timer with each data packet received and stored by a central queue of the node," in col. 4, lines 37-41. Fiacco is directed to a method and apparatus for providing a large number of error detection time-out value (EDTOV) timers, wherein each timer determines when an event has occurred or failed to occur in a bi-directional communications session (col. 2, lines 53-60). The EDTOV timers monitor the timing requirements of a communications protocol used for the bi-directional communications session between two devices over a communications link (col. 2, lines 62-65). A closer reading of col. 4,

lines 37-41 of Fiacco reveals that the cited portion merely states that timer values are configured as a timer array within a random access memory (RAM) 104 and that, preferably, this same RAM is used as a temporary buffer in which to store packets of data comprising each received frame of information. Applicants respectfully submit that Fiacco, by merely stating a preference for storing data packets and timer values in the same random access memory, does not teach or even suggest associating a separate timer with each data packet received. Moreover, Applicants respectfully submit that the cited portion of Fiacco indicates that the EDTOV timers are used to time *communication protocol events* such as a second communications device's response time to a request made by a first communications device. (See col. 1, lines 15-20; col.; col. 4, lines, 14-19; and col. 4, lines 62-65.) In col. 4, lines 51-53, Fiacco states that timers are started and stopped responsive to commands from a protocol processor. Applicants respectfully submit that a protocol processor is very different from a central queue.

As another example, for the reasons stated above, the proposed combination of Guttman and Ross fails to teach or suggest a packet processing method for a node of a data transfer network comprising the step of "providing said length of time [for which said data packet is stored in said central queue] to said central queue when said central queue is ready to transmit said data packet." The Office Action does not allege that Fiacco teaches or suggests this aspect of the present invention as recited in claim 1.

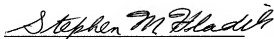
For the reasons stated above, the proposed combination of Guttman, Ross, and Fiacco fails to teach or even suggest all elements of applicants' claimed invention, as recited in claim 1. Claims 9 and 17 are also patentable over this proposed combination for the same reasons stated above with respect to claim 1. For these reasons as well as for their own additional recitations, applicants respectfully submit that claims 2-8, 10-16, and 18-24 are patentable over the proposed combination of Guttman, Ross, and Fiacco because these claims depend from claims 1, 9, and 17, respectively. Therefore, withdrawal of the rejection of claims 2-8, 10-16, and 18-24 under 35 U.S.C. §103(a) is respectfully requested, and allowance of these claims is respectfully solicited.

Conclusion

For all of the reasons stated above, applicants respectfully request allowance of all pending claims.

If a telephone conference would be of assistance in advancing prosecution of the subject application, Applicants' undersigned attorney invites the Examiner to telephone him at the number provided below.

Respectfully submitted,



Stephen M. Hladik
Attorney for Applicants
Registration No.: 55,270

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HESLIN ROTHENBERG FARLEY & MESITI P.C.
5 Columbia Circle
Albany, New York 12203-5160
Telephone: (518) 452-5600
Facsimile: (518) 452-5579